

THE IDENTITY OF LEWIS' MARMOT, *ARCTOMYS LEWISII*

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To which mammal the name *Arctomys lewisii* Audubon and Bachman, 1848, should be attached has remained uncertain for many years. The genus *Arctomys* Schreber is now known as *Marmota* Blumenbach, but at the time *Arctomys lewisii* was named, the genus also included species presently recognized as belonging to the genera *Ammospermophilus*, *Cynomys*, *Spermophilus* and others. The original description of *A. lewisii* was based on a specimen from a locality ambiguously given as "Columbia," and the describers assumed that the specimen had come from the vicinity of the Columbia River, in the northwestern United States. However, the description and the type-specimen do not conform to any species known to occur in the Columbia River region. It is the purpose of this paper to identify *Arctomys lewisii*, and to discuss its confused taxonomic history. I believe that the holotype did not originate in North America at all, but instead is a specimen of *Marmota baibacina*, the Central Asian montane marmot, for reasons presented below.

The Original Description

In volume 3 of "The Viviparous Quadrupeds of North America," the Reverend Doctor John Bachman (Audubon and Bachman, 1846-53) described a new species of marmot, *Arctomys lewisii* Audubon and Bachman, 1848, based on specimen number 461 in the Zoological Society of London collection, and now a skin and skull in the British Museum (Natural History), numbered 55.12.24.144 in their catalog. Bachman's written description was preceded by a color plate (CVII) based on an original study executed by John Woodhouse Audubon, the younger son of Bachman's co-author John James Audubon, from the type-specimen in London, and issued in volume 3 of the Imperial Folio (Audubon and Bachman, 1845-48). Subsequently, plates and text were published together in an octavo edition retitled "The Quadrupeds of North America," volume 3 appearing in 1854 (Audubon and Bachman, 1849-54). The name *Arctomys lewisii* is usually dated from 1853 (Baird, 1857; Allen, 1898) or 1854 (Hollister, 1916; Hall and Kelson, 1959). However, the name first appeared on the plate published in 1848, and according to the International Code of Zoological Nomenclature, a name published before 1931 becomes available if accompanied by a description, definition, or indication. An indication includes publication of the new name ". . . in connection with an illustration; . . ." Hence, the name takes date and authorship from 1848 (Audubon and Bachman, 1845-48).

As the specimen was attributed to "Columbia" both on the skin label and in the Zoological Society catalog, Audubon and Bachman interpreted this as ". . . the shores of the Columbia River . . .," naming it in honor of Captain Meriwether Lewis, first American explorer of that region.

Subsequent Attributions

Although Bachman unequivocally stated that the specimen possessed "the characteristics of the true Marmots," S. F. Baird (1857) called attention to the fact that Bachman described the thumb of *A. lewisii* as long, with a long nail. Both he, and subsequently J. A. Allen (1877 and 1898) suggested, on the basis of the supposedly well-developed, clawed hallux of the type-specimen, that it was not a *Marmota* at all, but rather a prairie dog (*Cynomys*), and J. A. Allen (1877:903) first proposed that the name *Arctomys lewisii* be applied to *Cynomys columbianus* (= *C. gunnisoni*), and later (1898:456), to *C. leucurus*, over which it had priority. However, neither Baird nor Allen examined the type-specimen.

It fell to Ned Hollister, while revising the genus *Cynomys*, to query Oldfield Thomas concerning the type of *Arctomys lewisii*. Thomas replied, according to Hollister (1916:26) that the specimen in question was ". . . a species of *Marmota*, and not of *Cynomys* as supposed by Dr. Allen." (The original correspondence is, unfortunately, lost.)

There the matter rested, and *Arctomys lewisii* has, when attributed at all, generally been regarded as a junior synonym of *Marmota flaviventris* (Audubon and Bachman). This is plausible in view of the reddish-orange ventral coloration visible in J. W. Audubon's illustration, and the specimen's supposed provenance; the question of the long, clawed hallux described by Bachman has not, it will be noted, been answered yet.

The Type-Specimen

Some time ago, during the course of an extensive systematic survey of the genus *Marmota*, I had an opportunity to examine the type-specimen of *Arctomys lewisii*, and to compare it with specimens of other taxa of *Marmota* in the British Museum collections, as well as with my own records on the marmots of a number of major collections in the Soviet Union, western Europe, and the United States. I unhesitatingly concurred with Oldfield Thomas that the specimen was assignable to *Marmota*, and not *Cynomys*. However, the skin had all toes severed at the base on all four feet, and was thus without claws.

I will return to this discrepancy between the published description by Audubon and Bachman, and the present condition of the type-specimen. Even though it lacked toes, I recognized the specimen as *Marmota baibacina* Kashchenko, 1899, a species that inhabits the mountains and

foothills of Central Asia, from the central Tyan Shans to the western Mongolian Altai (Ognev, 1947:279). The skin and skull are those of a young animal, probably about one year old and killed in its second spring of life, judging from the pelage and the fact that the third upper permanent premolar is not yet fully erupted.

In pelage color and pattern, *A. lewisii* resembles *M. baibacina* rather than the New World marmots. *Marmota baibacina*, and its close relatives in the Old World (*M. bobac*, *M. siberica*, *M. himalayana*, *M. camtschatica*, *M. menzbieri*) differ from all the New World *Marmota*, except arctic *M. broweri* in having dorsal guard hairs uniformly dark both at the base and tip, with a lighter middle band. Moreover, *M. baibacina* is characterized by its orangish ventral coloration, and brown head, lacking a pronounced dark cap, with the brown color extending down the sides of the head and neck to meet the orange throat.

Audubon and Bachman's description of the color of the type-specimen agrees in most respects with that of *M. baibacina*, for they note that ". . . the longer [dorsal] hairs, at their extremities [are] blackish brown . . . feet and belly, light salmon-red; tail, from the root for half its length, reddish-brown, the other half to the tip soiled white . . ." J. W. Audubon's illustration carefully reflects all of these characteristics of *M. baibacina*, and considering that he painted it from a museum skin, compares favorably with the illustrations of *M. baibacina* in Bobrinskii, et al. (1965) and Flint, et al. (1965). In contrast, Audubon and Bachman (1841:29) described the dorsal fur of *M. flaviventris* as ". . . on each hair a considerable space is occupied by dirty yellowish-white, which is gradually shaded towards the apex through brown into black tips of hairs yellowish-white . . ."

I also compared the skull of the type with skulls of approximately the same age of *M. baibacina* and *M. flaviventris* available in the British Museum. In qualitative characters such as shape of the nasal bones and post-orbital region, relative interorbital width, and curvature of the profile of the skull, *Arctomys lewisii* resembles *M. baibacina* and not *M. flaviventris*. This is also true of several measurements (Table 1).

Thus, in most features, the type-specimen and its description agree with the characteristics of *Marmota baibacina*. One discrepancy, however, is the terminal "soiled white" tail tip, conspicuous in Audubon's illustration, which led Allen (1898) to suggest that *Arctomys lewisii* might be a white-tailed prairie dog (*Cynomys leucurus*). My examination of the type revealed that the distal half of the tail retains the previous year's old, unmolted hairs. These are extremely faded, and contrast strongly with the rest of the fresh spring pelage. This retention of faded, unreplaced fur on the rump and tail is a frequent occurrence in the molt pattern of *Marmota* (Kapitonov, 1964).

Table 1. Comparison of selected cranial dimensions for "*Arctomys lewisii*" with *Marmota f. flaviventris* and *M. baibacina centralis*.

Dimension, mm	<i>M. flaviventris</i>	" <i>A. lewisii</i> "	<i>M. baibacina</i>
Length, mand. tooth row	18.4	22.4	21.9
Length diast.			
Upper	16.0	19.4	19.6
Lower	10.0	13.6	12.5
Width, p4	4.8	3.1	3.4
Length, p4	5.4	4.3	4.2
Width, m3	5.5	5.5	6.0
Length, m3	6.7	7.7	7.9

The Question of the Thumb

The second major discrepancy between the description of *Arctomys lewisii* and *M. baibacina*, or indeed, any *Marmota*, is that the ". . . thumbs, instead of being remarkably short and equipped with blunt nails, have long nails nearly the length of those on the other toes" (Audubon and Bachman, 1854:31). Moreover, toe coloration is described, and the measurement of hind foot length (heel to middle claw) is given. Yet the digits are now wanting on all four feet.

One possibility is that Bachman accurately described the condition of the digits of the type-specimen at that time, but that the toes have been removed since then, a highly unusual procedure. This possibility leaves the long, clawed hallux unexplained. The other possibility is that the type-skin was originally without toes, and that the details in the description were added for some reason—in this case the long thumb with its claw never existed. A case can be made for this second possibility, if the history and context of the description of *Arctomys lewisii* are considered.

Bachman's "Discovery" of *Arctomys lewisii*

Bachman was in London only once, after visiting J. J. Audubon and his family in Edinburgh, in the summer of 1838. He worked in the collections of the British Museum and the Zoological Society of London for several weeks before going on to Germany, and returned home in January, 1839 (C. L. Bachman, 1888:175; Ford, 1964:354). J. J. Audubon and Bachman published, in 1841, "Descriptions of new species of quadrupeds inhabiting North America," based in part on specimens examined in the Zoological Society of London, presumably in 1838. Among these is *Arctomys* (= *Marmota*) *flaviventer* Audubon and Bachman (1841:29), based on a ". . .

specimen in the [Zool. Soc. Lond.] collection brought by the late David Douglass [sic] . . . from the mountains between Texas and California, and is marked in their printed catalogue of 1839, 'Arctomys *flaviventer*. No. 459, Bachman's Mss.'" (*op. cit.*:30). The printed catalog referred to is a supplement to the catalog published by Waterhouse (1838). In the 1838 catalog, the following North American marmots are listed:

"459. Quebec Marmot . . . From *North America*. Arctomys Empetra. Schreb.

Presented by Dr. Richardson.

459a. Ditto ditto . . . Habitat *North America*.

460. Whistler . . . Habitat Rocky Mountains.

Arctomys? pruinusos. Rich.

Died in the Menagerie.

Presented by B. King, Esq.

461. Short-tailed Marmot . . . Habitat *Columbia*.

Arctomys brachyurus? Harlan."

Specimen number 459a of the 1838 catalog was designated the type of *Arctomys flaviventer* by Audubon and Bachman (1841); they also mention, in "The Quadrupeds of North America," having examined specimen no. 459 (vol. 1, pg. 24, 1849), and specimen no. 460 (vol. 3, pg. 19, 1854). It would be reasonable to assume that Bachman also examined specimen no. 461 during that same period in 1838. This was not the case.

On 31 October 1846, Victor G. Audubon, John James Audubon's elder son, wrote to Bachman, requesting the scientific names to accompany the plates of the sea otter, musk ox, "whistler," "Columbia pouched rat," "hare from Texas," and "short-tailed marmot" (letter 262, by permission, Houghton Library, Harvard Univ.). Bachman replied in a letter to J. J. Audubon, dated 5 November 1846, giving the names of the first five, and continuing: ". . . 6. *Short tailed marmot*. Now friend—here is fun. By some unaccountable means I never saw the specimen in England. I am deeply mortified about it. It has never been described Lewis & Clarke mention it. No specimens were brought. Harlan named it Arctomys? brachyurus—short tailed—named it so after Lewis & Clarke's description. Now we must name it, but alas I don't know whether it is an Arctomys or Spermophylus—I am quite in a quandary. Perhaps we had better wait till we hear from Waterhouse through John [Woodhouse Audubon, J. J. Audubon's younger son]. The specific name—brachyurus of Harlan agreeable to our rule we must not take, besides it is an improper one as its tail is larger than many others. Can't you or Victor do this. Just send me an outline of the drawings dabbling a little of the colours to give me an idea of it. I strongly suspect it must be a spermophile. Write to John at once

& let him ask Waterhouse to examine it—but let him not hint that it is not described as those Zool. boys will name it an hour after. O that I had wings for an hour & telegraphic speed to carry me to London—but here I am & cant move . . .” (Copy of letter in Charleston Museum, Charleston, South Carolina; a variant version of this letter appears in C. L. Bachman, 1888:224.) Apparently Bachman’s request was not complied with promptly enough to suit him. In a letter dated 14 December 1846, to Victor Audubon, he complained “. . . You promised to send me a lithograph of the short tailed marmot till then I am in the dark—I dont even know whether it is a Spermophil—John & Waterhouse ought to be consulted

Now for your plates . . . 107. Short tailed marmot No name till I see it . . .”

All of these are clearly references to “*Arctomys brachyurus*,” and the MS plate number (107) corresponds to the number of the plate of *Arctomys lewisii* that was finally published.

On 27 December 1846, Bachman wrote again to Victor “. . . Above all say to John that we wish the names from Waterhouse of the species he is figuring. I have great doubts about some of them. I wish the short tailed Marmot to be examined in regard to the Genus. I wish John was as willing to write as he is to paint but John wont do it, what shall I say more . . .” (letter, Charleston Mus.).

I have not yet been able to determine whether Victor or John W. Audubon wrote to Bachman concerning *A. lewisii*, but he did receive the promised lithograph. A letter from Victor, dated 24 March 1847, referring to another request from Bachman concerning a deer, assures him that “When we have a proof [plate] I will send it to you so that you may see it as you did the short-tailed marmot.” (letter 264, Houghton Library, Harvard University). I find no further reference to *Arctomys lewisii* in the subsequent Audubon-Bachman correspondence I have seen; it appears that Bachman’s questions concerning the “short-tailed marmot” were resolved between 27 Dec. 1846 and 24 Mar. 1847. It may be that the lithograph proof was the only descriptive material that Bachman received. Imperial Folio plate 107 reveals a clawed hallux on the specimen of *A. lewisii* much more clearly than the smaller, redrawn octavo edition. Unfortunately, the location of J. W. Audubon’s original study is unknown (Ford, 1951:215).

Bachman was initially inclined to the position that “*Arctomys brachyurus*” was a spermophile, but was assured by Victor and John that it was a marmot, *Arctomys*. He later decided that the name given the specimen in the catalog “*Arctomys? brachyurus* Harlan,” actually applied “. . . to some species of spermophile—probably *Spermophilus townsendii* . . .” (Audubon and Bachman, 1849–1854, vol. 3, pg. 34), and that Zoological

Society specimen no. 461 thus represented an undescribed species of marmot.

Origin of the Type-Specimen of *Arctomys lewisii*

The remaining substantive question is: How did a specimen of *M. baibacina* happen to arrive at the Zoological Society of London under such circumstances that it was labeled "Habitat Columbia," and that J. W. Audubon was told, apparently, that the specimen ". . . was sent to the Zoological Society by the British fur-traders who are in the habit of annually carrying their peltry down the Columbia River to the Pacific" (Audubon and Bachman, 1849-1854).

The Zoological Society collection was started by the "Zoological Club" in 1823 (Scherren, no date; Thomas, 1906). The specimen was not listed in a catalog of the collection published in 1829 (Anon.), but was nine years later (Waterhouse, 1838); the period during which the specimen might have arrived in London is thus defined.

One possibility is that the specimen actually was obtained by British fur-traders. Pelts from the North West Company, which later merged with the Hudson Bay Company, were shipped from Astoria on the Columbia River, across the Pacific to London, on ships which often called at Chinese ports (Davidson, 1918:164). The trade in furs between Russia and China was of long standing, and "Furs constituted an extraordinarily large share of the goods exported by the Russians to China . . ." (Fisher, 1943:224). Hence, it is possible that the skin of a *M. baibacina* taken in the Tyan Shan or Altai might make its way from a Russian trading town to a Chinese port, there to be picked up by a British trader homeward bound to London.

The principal reason to doubt such a chain of events is the condition of the type-specimen of *A. lewisii*. Although the digits are severed, most of the skin of legs and feet is present, and the cuts in the skin are not the sort that would have been made by a hunter pelting a marmot to produce a skin for market (see Louashkin, 1937, Pl. XCVII). Finally, one would not expect a commercial skin to remain associated with its corresponding skull throughout the sort of journey hypothesized above.

Since the condition of the specimen suggests that it was obtained with its scientific significance in mind, with what scientific collections might a specimen of *M. baibacina* become associated during the time period in question (1823-1838)? One possibility would be the several collections made by David Douglas in western North America between 1824 and 1833 (McKelvey, 1955). Douglas, it will be remembered, was the collector who obtained the specimen of *Marmota flaviventris*, no. 459 in the Zoological Society collection, that was first described by Audubon and Bachman.

Douglas in 1831 visited Fort Ross, in what is now northern California, and later corresponded with Baron Wrangel, governor of Russian America (Morwood, 1973). It is possible that a Russian marmot came into his possession in this connection, and was later sent to London with his other specimens.

Another possibility involves the ship *Blossom*, commanded by Captain F. W. Beechey; the naturalist aboard was George T. Lay, and the surgeon, Alexander Collie. The *Blossom* left England on 19 May 1825, and eventually reached Petropaulski, Kamchatka, on 27 June 1826. There it met with Baron Wrangel's ship *Modeste* and stayed five days. The *Blossom* visited Petropaulski a second time on 3 July 1827, staying this time 15 days; it arrived home on 12 October 1828 (Beechey, 1831). During the course of their two visits to the Siberian port, Lay and Collie might have obtained, by gift or exchange, a Russian marmot specimen, which later arrived in London with the other scientific collections obtained during the course of the voyage (Richardson, 1839).

A third possibility is that it was part of a collection of Russian mammals obtained by either the Zoological Society or the British Museum from the collector I. G. W. Brandt of Hamburg, sometime prior to 1843. Brandt sent to the British Museum a number of mammal specimens, including a "*Tamias striatus*" [= *T. sibiricus*] and "*Spermophilus altaicus*" [= *S. undulatus*] from the Altai Mountains, and a "*Marmota bobac*" from Siberia (Gray, 1843). Moreover, there is considerable similarity in manner of preparation between the "*M. bobac*" obtained from Brandt, and the type-specimen of *Arctomys lewisii*, which differentiate both specimens from many others prepared during that period. For example, in addition to a mid-ventral cut, both specimens have cuts around the bases of three legs; wire rather than wood was used to support the tail; the stuffing material—straw with bits of cotton—is similar; and the stitch pattern used to sew the cuts is alike in both. Also, both specimens are shaped similarly, with a rounded, slightly elevated head distinctly set off from the body by a constriction in the neck. The plantar surfaces of the forefeet face up, and those of the hind feet, down. Thus, it seems possible that the specimen of "*M. bobac*" received from Brandt, and the type-specimen of *Arctomys lewisii*, may have been prepared by the same person.

I have not found any record of purchase of specimens from Brandt by the Zoological Society. However, the first year that Brandt sold specimens to the British Museum was 1840. Since Gray only began to register specimens in the British Museum catalog in 1837 (Thomas, 1906), Brandt is not likely to have had a market for his specimens there prior to that date, and it is possible that he sold some to the Zoological Society, which was still actively building its collections in the period 1829–1838 (Scherren, no date).

Taxonomic Implications

It is unlikely that a satisfactory determination of the way in which the type-specimen of *Arctomys lewisii* reached the Zoological Society of London will ever be made.

By whatever means this skin and skull of *Marmota baibacina* reached London, its designation as the type of *A. lewisii* by Audubon and Bachman must be reckoned with. J. F. Brandt (1843) first applied the name *Arctomys baibacina* to a specimen of marmot from the Altai Mountains of south-central Siberia. Unfortunately, he did not describe the specimen. This *lapsus* was corrected in 1899, when Kashchenko recognized that *M. baibacina* was a *nomen nudum*, and renamed and described the species. In the meantime, Audubon and Bachman had named and figured (1848), and subsequently described (1853) a specimen of *M. baibacina* although they attributed it to the wrong continent. The name *M. lewisii* thus has priority over *M. baibacina*.

However, due to the many uncertainties surrounding it, and the likelihood that the specimen will never be accurately ascribed, nomenclatural stability is not served by replacing the name *baibacina* with *lewisii*. Moreover, *lewisii* has been virtually unused since it was proposed, except for its misapplication by J. A. Allen (1898), following Baird (1857) as a synonym of *Cynomys leucurus*.

Under the terms of Article 23b of the International Code of Zoological Nomenclature, "A name that has remained unused as a senior synonym in the primary zoological literature for more than fifty years is to be considered a forgotten name (*nomen oblitum*).” Accordingly, I have referred the name *Arctomys lewisii* Audubon and Bachman, 1848 to the International Commission on Zoological Nomenclature, for inclusion on the Official List of Rejected and Invalid Specific Names in Zoology.

Acknowledgments

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B. H. Blake reexamined the holotype of *A. lewisii* and British Museum

(Natural History) records several times, to answer my specific questions as they arose, and criticized the manuscript, as did H. Setzer (Nat. Mus. Nat. Hist., Washington, D.C.), and G. Corbet (B.M.[N.H.], London). Without the help of these persons and others, this study could not have been completed.

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